SHIPS and how to draw them

by W.J. AYLWARD

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SHIPS AND HOW TO DRAW THEM

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HIPS

nd How to Draw Them

BY W. J. AYLWARD

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A Word from the Author

A ship is an intricately organized structure of many important parts. To draw a ship, an artist or student needs some understanding of its organization.

A ship, strictly, is a three-masted sailing vessel square rigged on all three masts. With more masts similarly rigged, she becomes a four or five-masted ship.

If she has her aftermost mast fore-and-aft rigged, she becomes a bark, perhaps a four-masted bark. If only the foremast is square rigged, she becomes a barkentine.

A brig has but two masts, both square rigged. If her mainmast has a mainsail like a schooner's with a three-cornered gaff-topsail above it and no yards, while the foremast remains square rigged, the vessel is called a half brig or hermaphrodite brig. This type of vessel is sometimes mistakenly called a brigantine, which carries a single square topsail above the main.

If a vessel has but one mast with a fore-and-aft mainsail she is a sloop, even if she carries a square topsail as was done in the eighteenth century. A vessel with two or more masts fore-and-aft rigged is a schooner—two-masted, three-masted, or more.

A ship, generally, may be any important vessel, especially a seagoing vessel. "The way of a ship in the sea" did not necessarily refer to a three-masted square rigger.

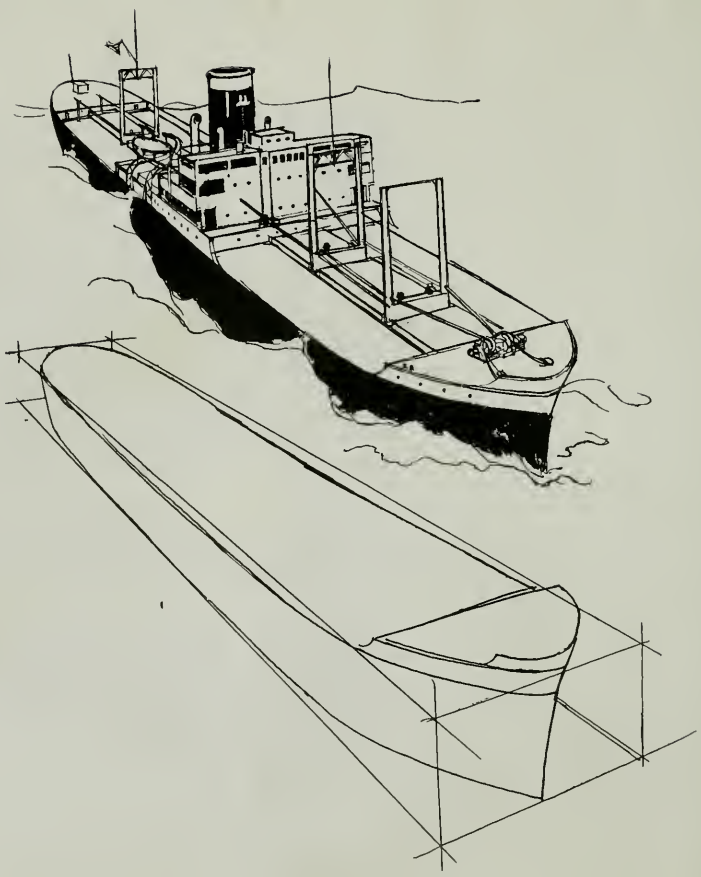
Do not underrate a ship by calling her a boat. The ship "Queen Mary" could stow fifty boats.

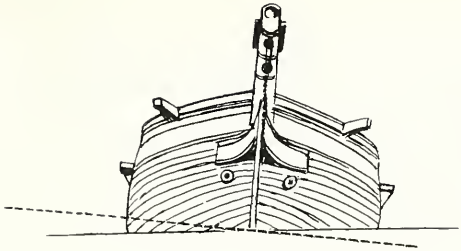
Perspective

Perspective is the only exact science having anything to do with art, and it cannot be ignored. Its primary value is to help create the effect of the third dimension. A serious error in perspective cannot be overcome by any amount of tone or color. Get a book on elementary perspective which can be understood (many cannot).

But perspective in architecture, railroad tracks, and interiors is one thing. Perspective afloat is quite another matter, because in anything like a seaway the vanishing points of a ship are constantly chasing each other up into the sky or diving down into the deep and dark blue sea.

In the diagrams, you will note that the ship above, rolling away from you, has the vanish-





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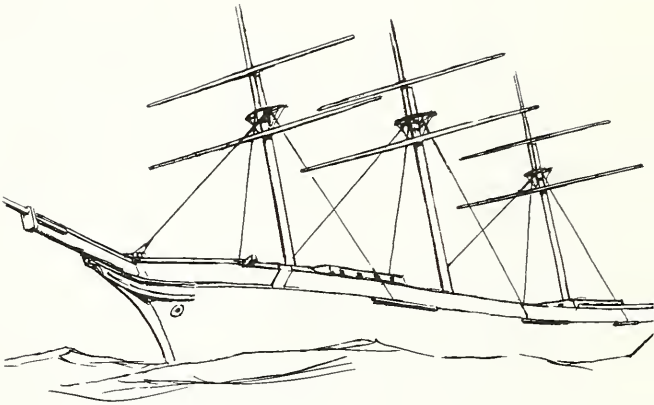

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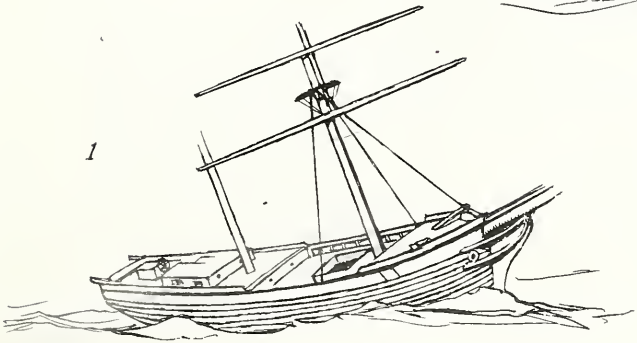

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ing point of the squared yards in the water. The smaller ship to the left, rolling toward you, would have the vanishing point of her (squared) yards in the sky.

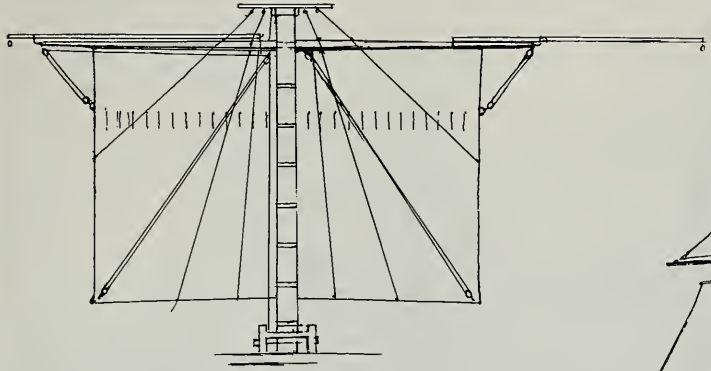
Except in port, however, yards are seldom squared. But when you know where they **would** be if squared, you can trim them forward or aft as the wind calls for.

On an even keel, a vessel's masts are perpendicular to the horizon and her deck parallel with it. The vanishing points, of course, are on that line.

As soon as a vessel lists (leans over), the same rule applies, but the vanishing points are now on what is called the false horizon (dotted line, Figure 2).

In Figure 1, the yards squared with the keel would have their vanishing points well off to the left under the true horizon, while in Figure 3, the vanishing points would be up in the sky far to the right. A good-sized drawing board is necessary for accurate perspective. For a large drawing, the floor is useful.

Do not force your perspective. It will distort your ship.

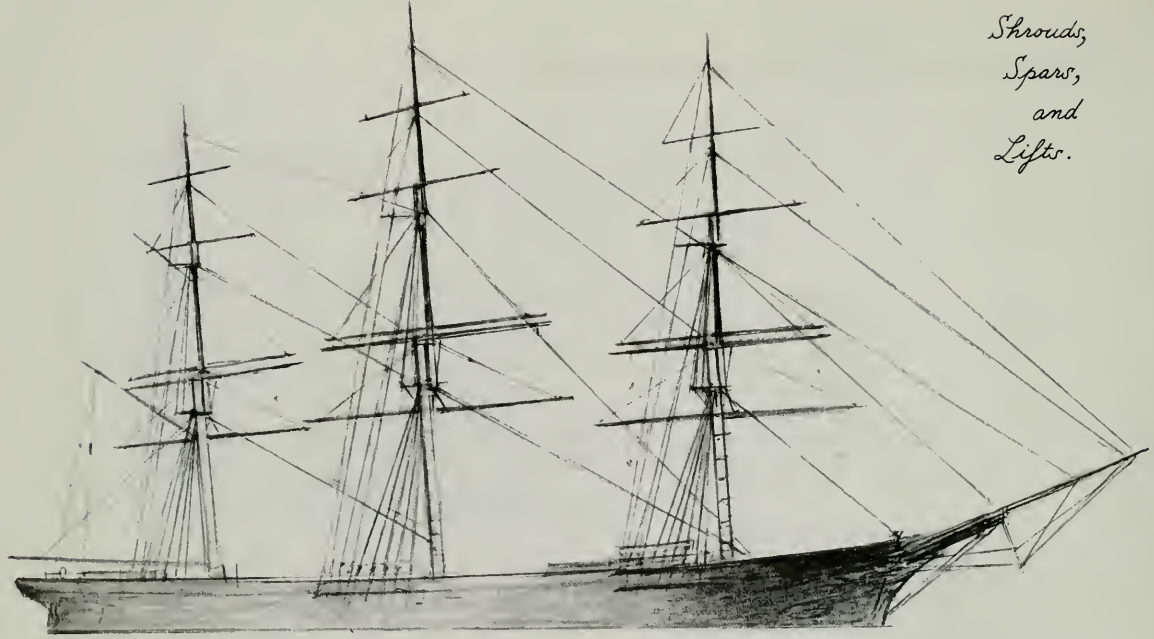


Studding Sails

The first thing to do after the order "Out studding sails" is to run out the booms.

Note how one boom is out and the boom on the other side of the yard remains housed.

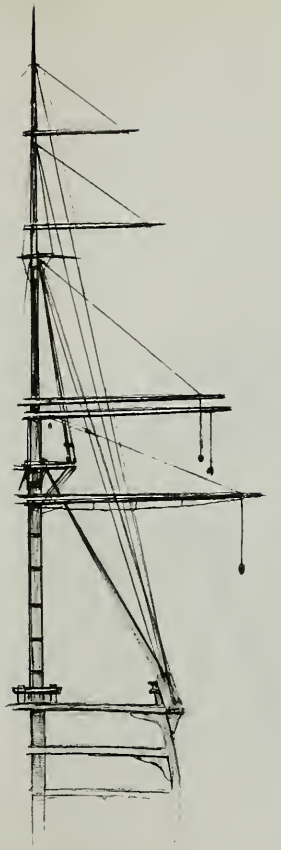
A studding sail measures half the area of the sail to which it is an adjunct. But about one-fifth of the studding sail is overlapped by the principal sail, hence only four-fifths of it is seen from ahead. Note the diagram on this point.



Shrouds, Spars, and Lifts.

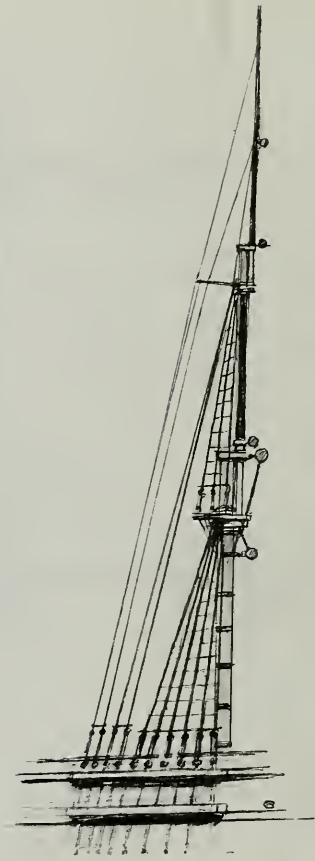
Here is the spar plan of a ship, featuring the stays supporting the masts from forward. All other stays lead aft—port or starboard—to the rail. To the right on the facing page are shown the shrouds and topmast backstays.

The lower shrouds lead up to and are looped around the

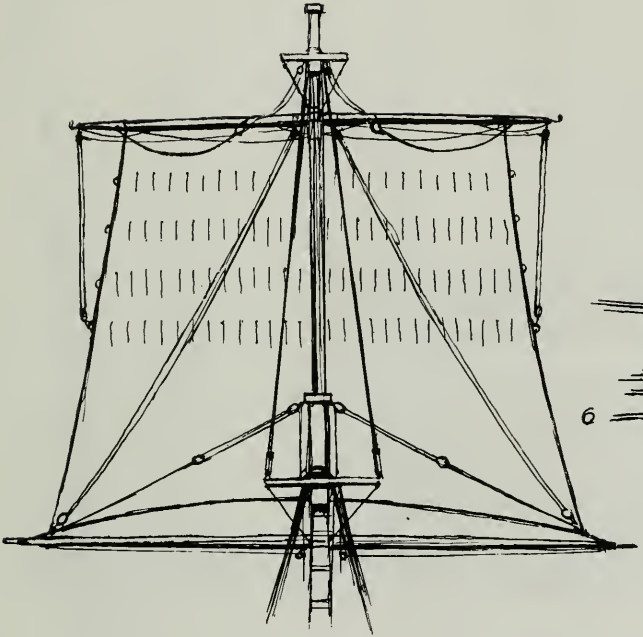


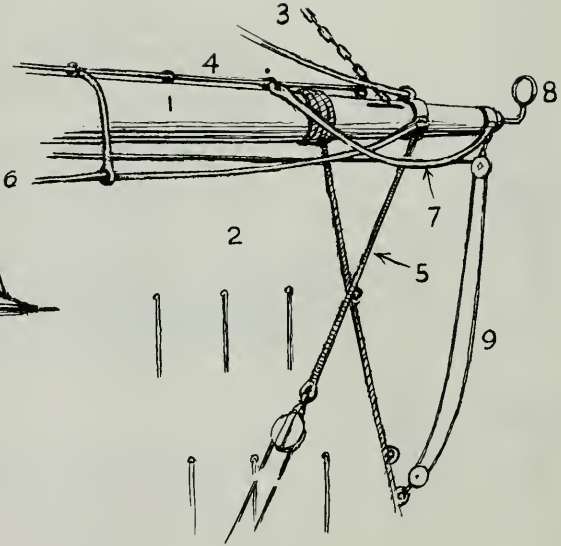
mast at the hounds, where they are seized in a bight, thence back to the same rail to be secured to the strong iron chain plates bolted to the ship's timbers. The rigging is set up taut by means of two deadeyes drawn and laced together by stout rope lanyards.

The topmast shrouds, three in number, are set up the same way but come no lower than the tops. Here iron rods called futtock shrouds take up the strain. The diagram to the left shows this arrangement, as well as the spread of the rigging and the lifts that support the yards. Learn one side of a mast and you know both sides. When you know one mast of a ship you know all three.



Reefing a Topsail

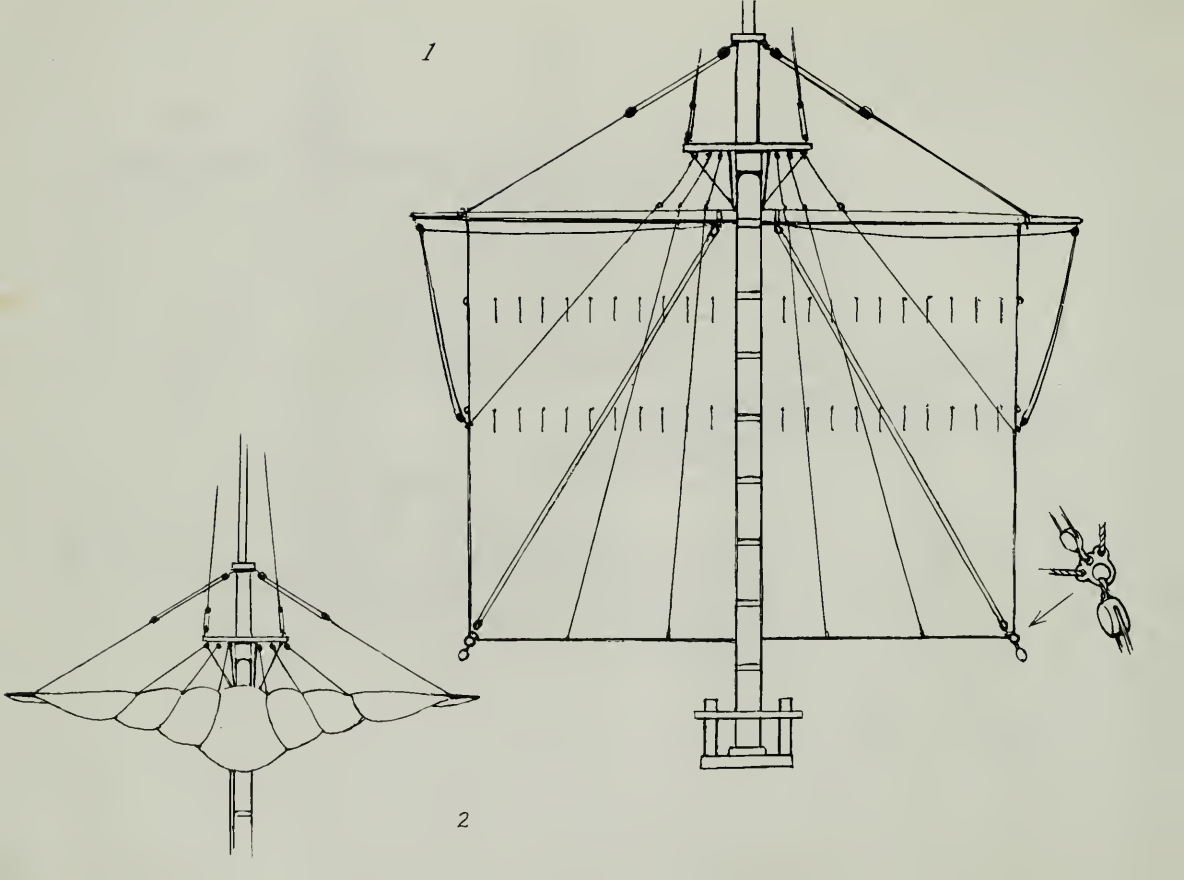




To close reef a modern double topsail, the upper half is merely furled. Not so simple the old-style single sails. Most of them had three reefs, some four. The yard was lowered to the cap (or lower masthead). The sail was then gathered in folds by means of clewlines and buntlines. Next, the reef tackle was manned, both sides and the outer edges or leech being hauled to the proper reef earring. This earring was lashed to the yard arm. The reef points were tied around the sail, which was then hoisted reefed. This operation sometimes took hours of heartbreaking labor in foul weather.

The diagram shows:

1. The tip of the yard arm.
2. The upper corner of the topsail.
3. The chain sheet of the topsail.
4. The iron jackstay to which the head of the sail is lashed.
5. The pendant for the brace to swing the yard.
6. The foot rope with its supporting stirrup.
7. The Flemish horse, an extension of the foot rope.
8. The iron ring at the tip of the yard, through which the studding-sail boom is run outboard.
9. The reef tackle.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How the Mainsail Is Furled

The diagrams on the opposite page give the basic formulas for all square sails.

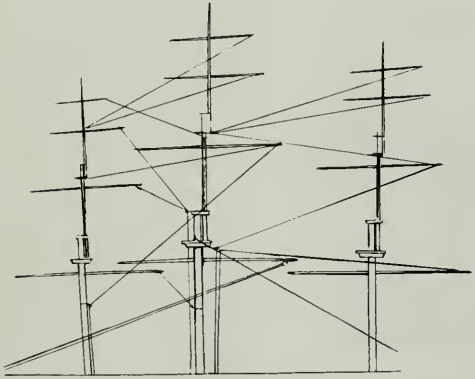
Figure 1 shows the mainsail set, with the gear for furling it, from aft looking forward.

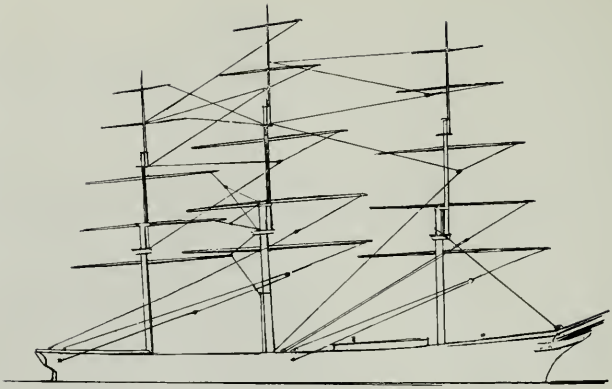
The upper edge or head is lashed to an iron rod running from one end of the yard to the other through eyebolts in its top; this rod is called the jackstay. The outer edges (leeches) of the sails, port and starboard, are called weather or leeward under way. All corners are called clews.

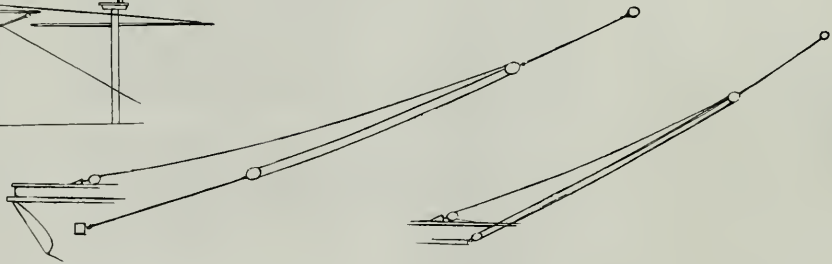
At the command "Clew up the mainsail," both lower corners are hauled up to the yard close to the mast by the clew tackles (pronounced **tay-kuls**) or clewlines. Then the buntlines (which lead from the yard to the foot of the sail) are used to bundle up the sail into loose folds, spilling the wind. The leech lines gather in the outer edges and the sail is then loosely furled as in Figure 2.

At the command "Lay aloft and furl," the men scramble up the rigging and out on the yard by means of the foot ropes, bundle the sail into a tight roll, lash it securely with gaskets (short ropes on the yard for that purpose), and the operation is complete.

Rigging Diagrams







Main Brace

Fore Brace

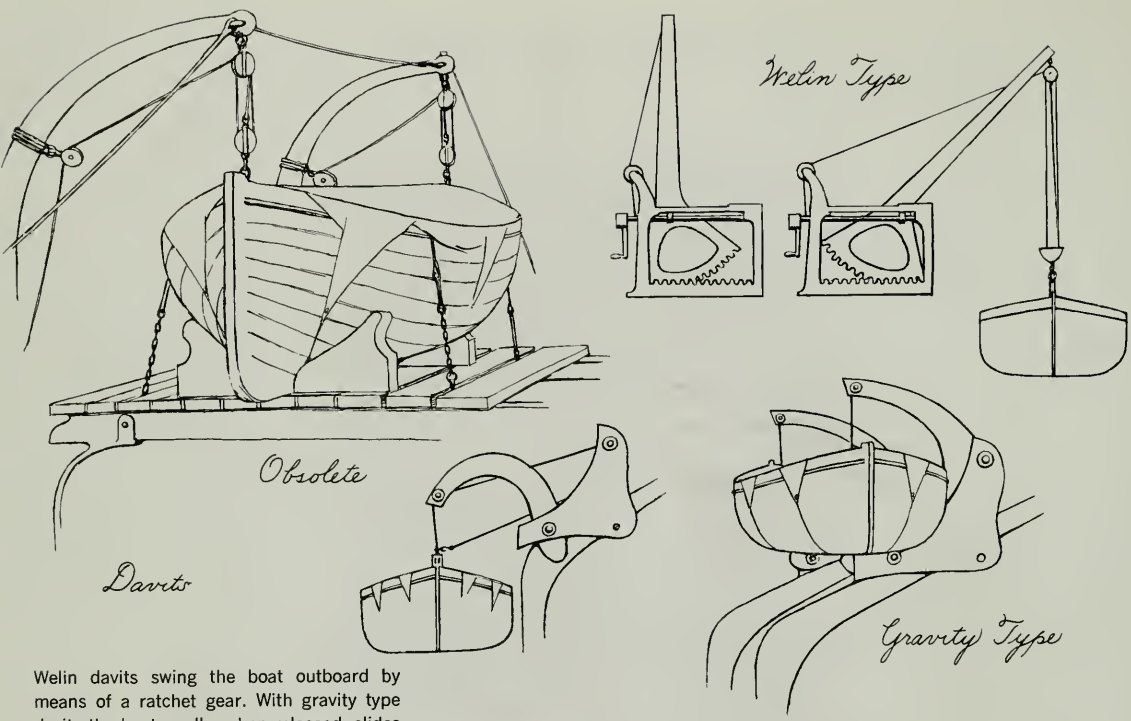
How the Yards Are Swung

The diagrams opposite show the yards as they are when all sail is set, and the lead (as in leader) of the braces. Only the starboard braces are shown. The port braces are the same. The main brace and the fore brace are shown separately. They are fitted with extra gear (purchases) to aid in swinging the ship's heaviest yards and largest sails.

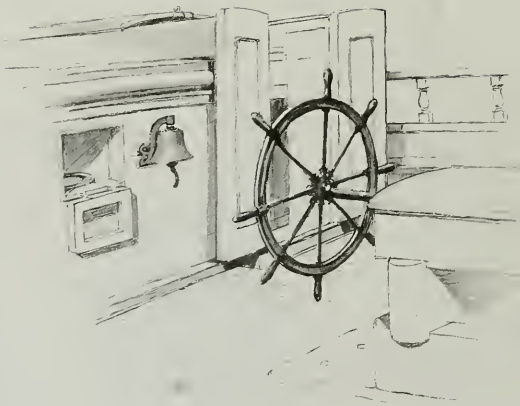
The fore brace leads to a block on the forward end of the main channels; the main brace leads to a heavy timber called the bumpkin, projecting from the ship's side close to the stern. The hauling parts of both these braces lead to blocks fitted in the main rail directly above the standing end. The lower-topsail braces for both masts lead to similar blocks each a foot or so aft of its mate.

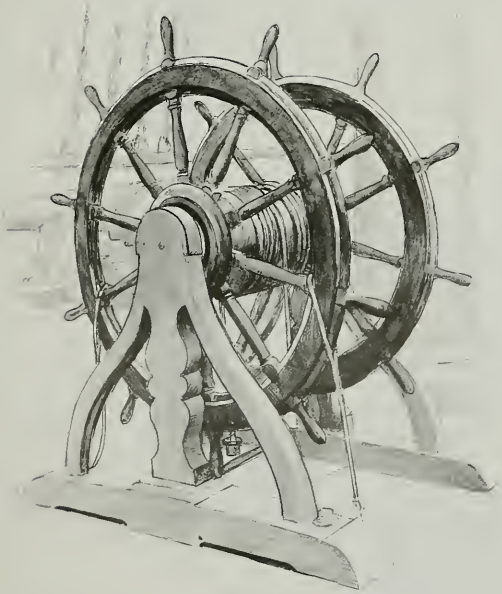
In beating to windward, the lower yards are braced in as far as they will go; the upper yards are not braced quite so far in. In running before the wind, the yards are square with the keel. In any other wind abaft the beam, the yards are squared with the direction of the wind.

The lower yards are neither hoisted nor lowered but suspended by heavy chain slings from the crosstrees; they swing on strong iron swivels called cranse irons. All the upper yards are hoisted and lowered by halyards and tyes secured to iron rings called parrels. The parrels are fastened firmly to the center of each yard; leathered and greased, they travel freely up and down the mast.



Welin davits swing the boat outboard by means of a ratchet gear. With gravity type davits the boat cradle, when released, slides down inclined skids; the arms then swing the boat outboard.



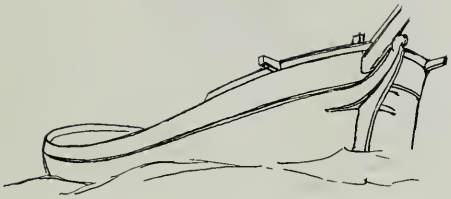


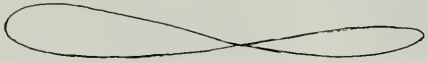
The Helm

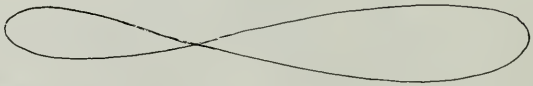
The helm is an important and outstanding object on a ship's deck. The double wheel in the illustration at the left belongs to the U.S.S. "Constitution". This ship also had an emergency steering gear between decks, less exposed to gunfire. In contrast is the diamond-geared iron wheel of the coaster "Lizzie D. Small" (1866), shown above.

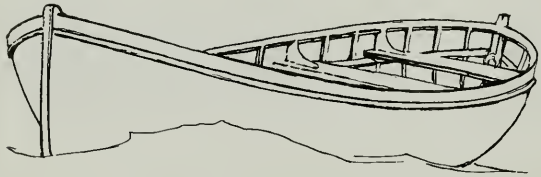
Trace each of these swirling lines and place it over the nearest rowboat. You will then see how useful the figure eight is in reproducing the sheer of the gunwale on both sides.

The "8" is not as marked on the hull of the schooner above the rowboats, but it is there nonetheless.

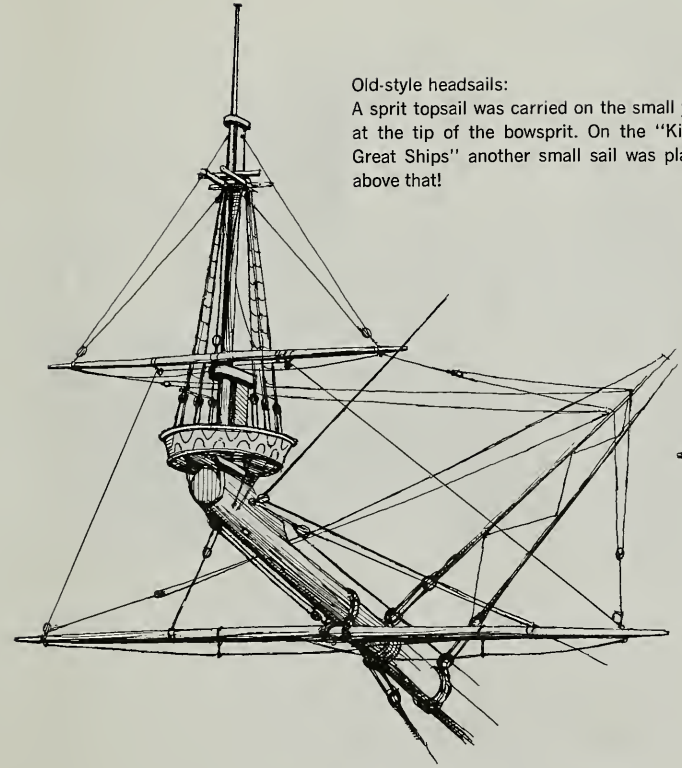


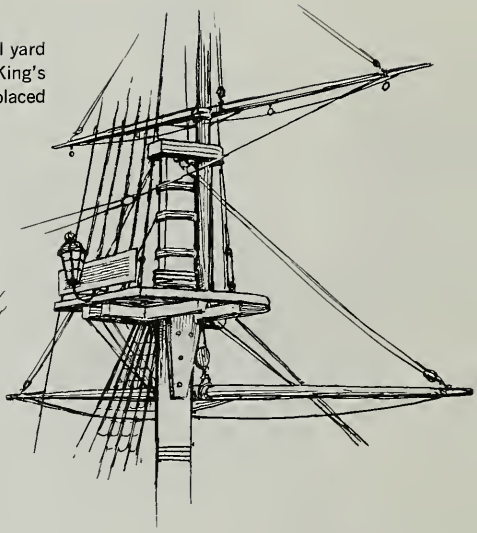




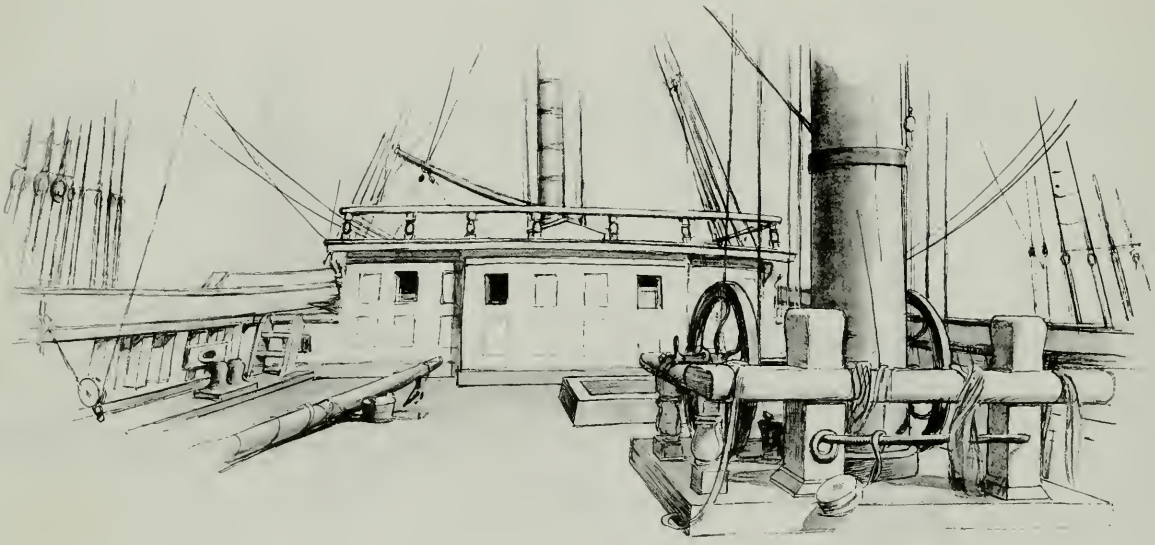


Old-style headsails:
A sprit topsail was carried on the small yard at the tip of the bowsprit. On the "King's Great Ships" another small sail was placed above that!

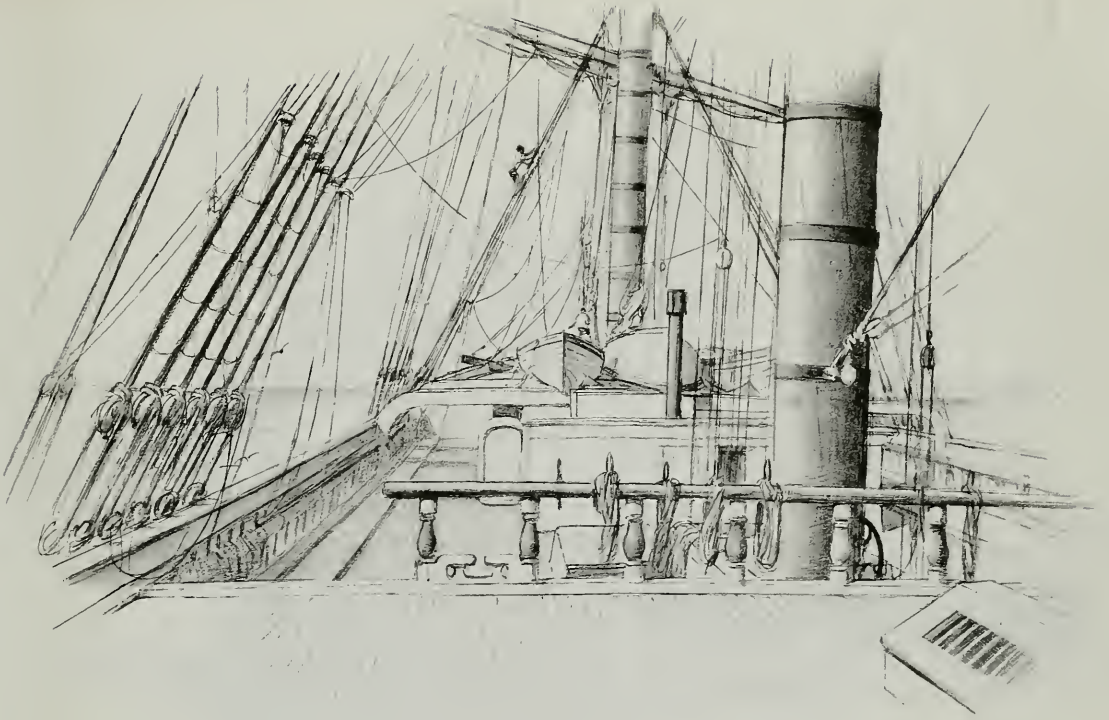




Fore-top: The lower shrouds are left out to show the construction of the top itself.



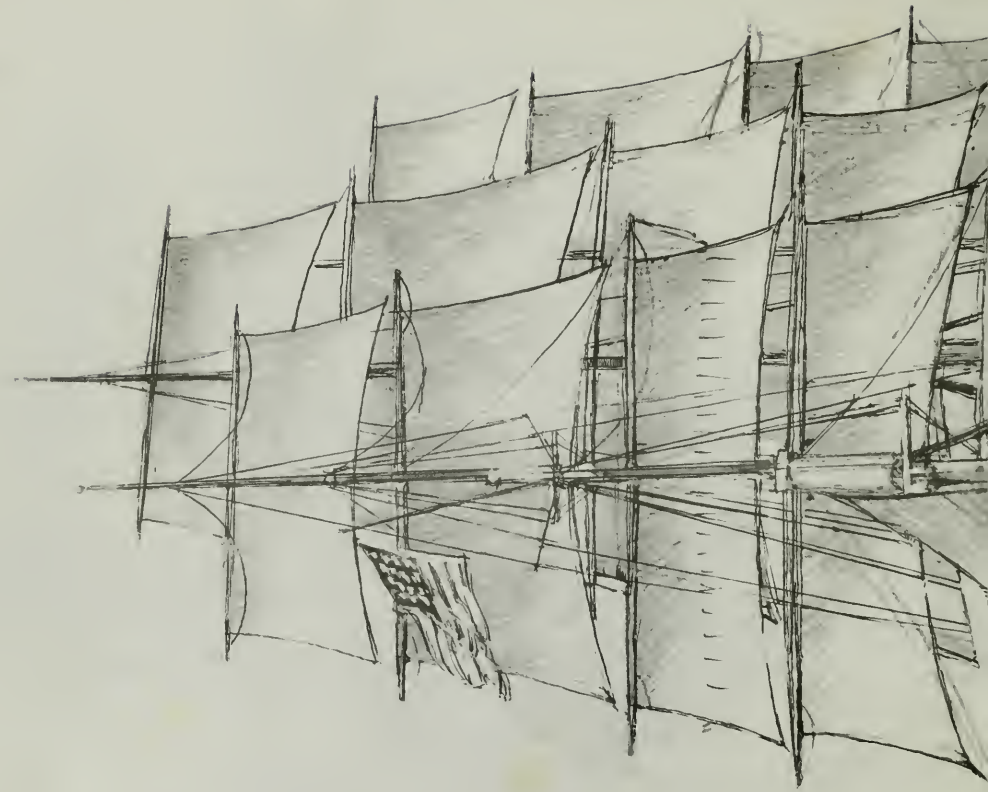
Looking Aft (Ship Out of Commission)



Looking Forward

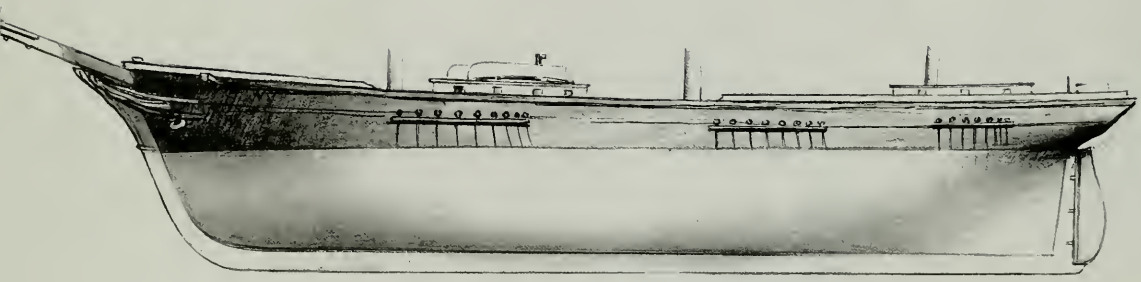
A Cape Horner

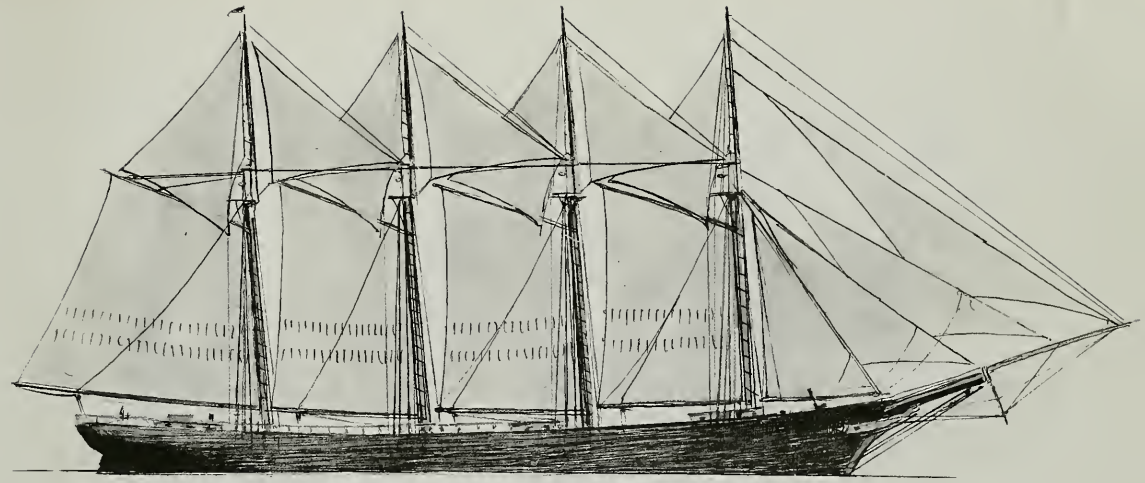
Bow View of a Cape Horner



Stern View of a Cape Horner

A Profile Model of a Cape Horner

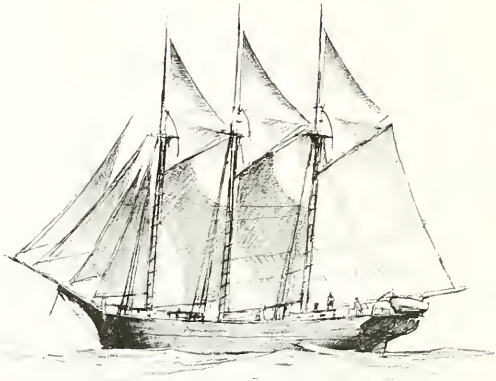




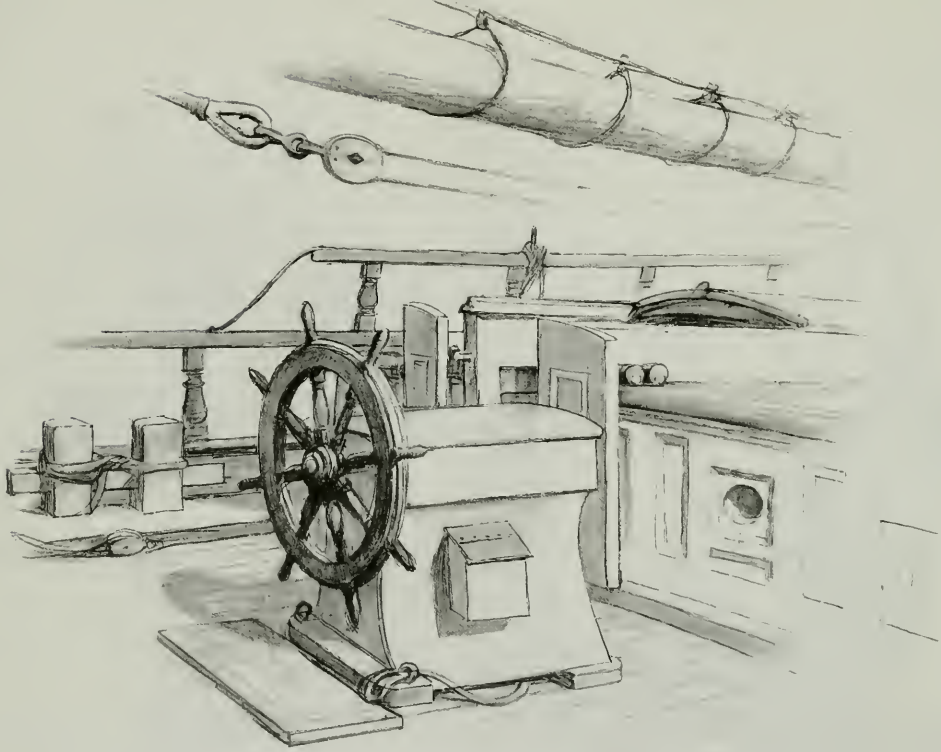
Schooner

The schooner—a truly American vessel developed as a carrier for trade along the Atlantic seaboard—proved to be a fast, economical rig. Gloucester fishing schooners were famous for speed and seaworthiness. Cargo schooners, designed to meet the competition of steamers, were built with five, six, and even seven masts. Schooners were operated by small crews, with a donkey engine to hoist sails and anchors. They outlasted the square-riggers but are now seen only rarely.

Great Lakes Topsail Schooner

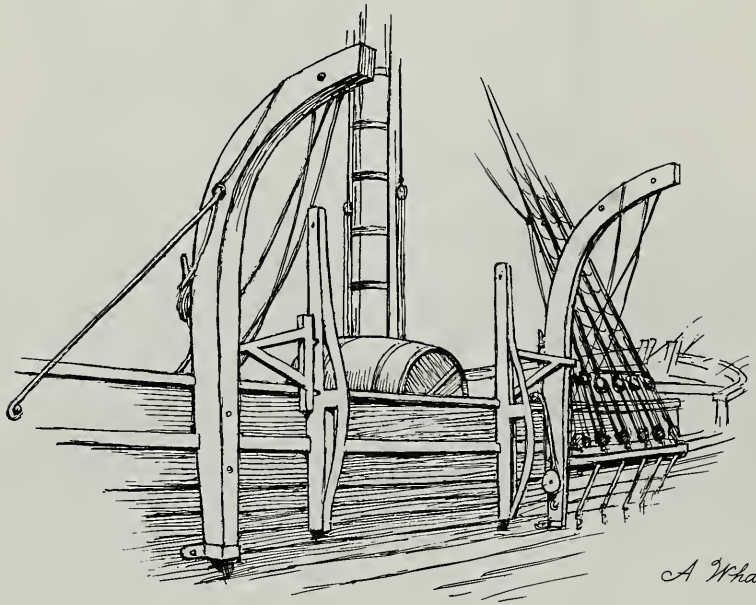


Three-Masted Schooners



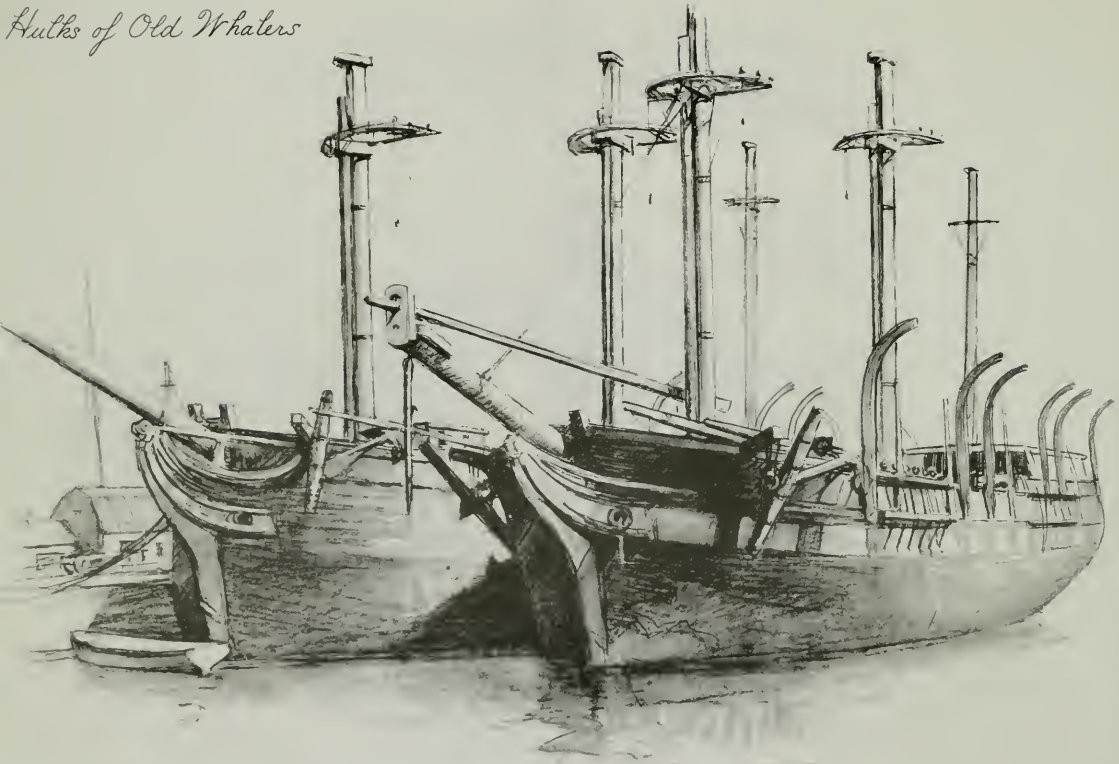
The schooner "American Team" (circa 1876) had a peculiar type of steering gear, the wheel box being forward of the wheel.

In this close-up, note that the davits are bolted solidly to the vessel's side and braced with iron rods. Between the two davits are minor brackets which, after the boat is hoisted, are swung out under its keel for added support. The light craft is then securely lashed in place.



A Whaler's Davits

Hulks of Old Whalers



A Whaling Bark of About 1840

Whaling Bark, 1875

Whalers

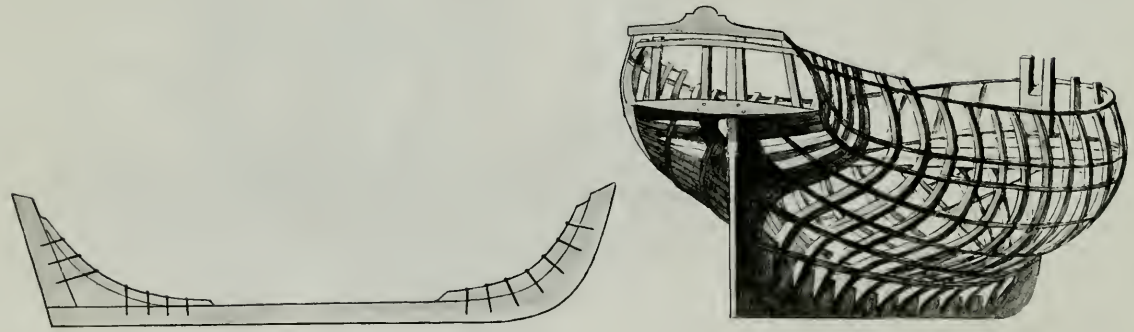
Whalers were splendid examples of how self-sufficient sailing vessels could be. Though seldom weighing over 300 tons, they carried as many as 38 men on voyages lasting as long as four years.

The distinguishing features of a whaler were the five boats slung overside, the bulky hull, the sails smoky from the tryworks on deck, and the top-gallant crosstrees crow's-nests on fore and mainmast.

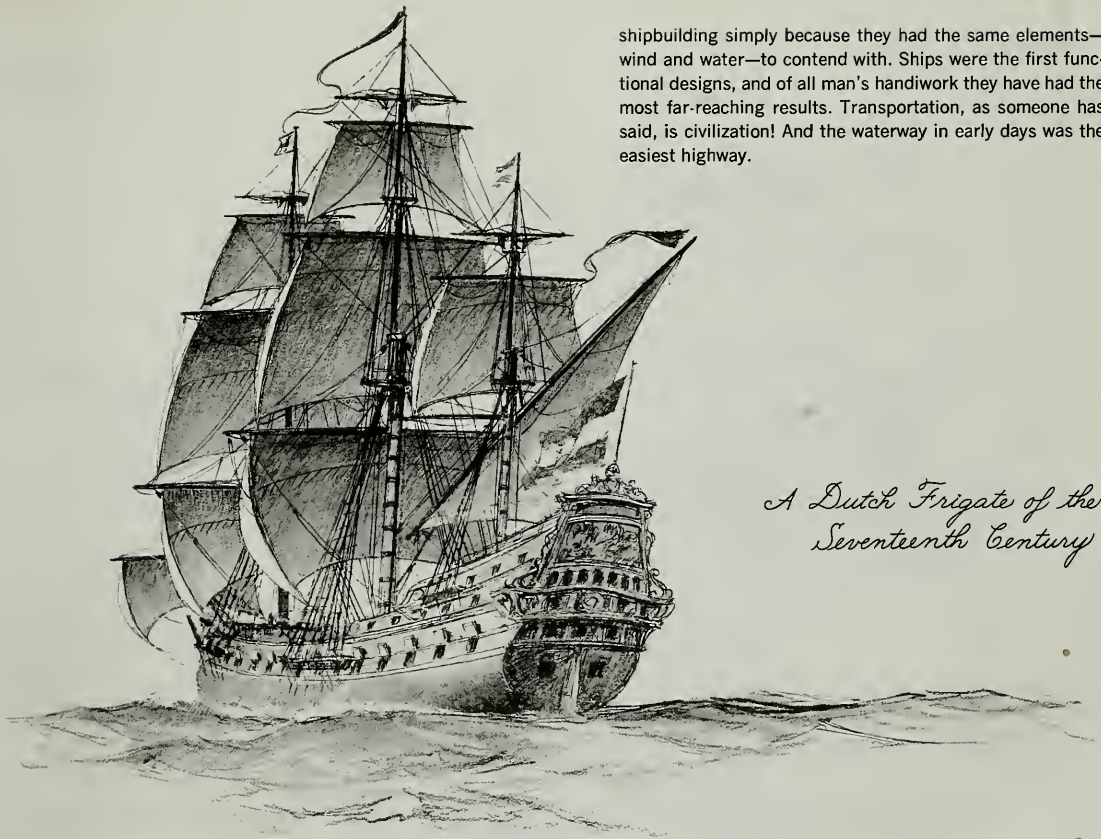
A Barkentine

When within reach of a good public library—or better still, a marine museum—go in and study some ships of the past. You will profit from the experience.

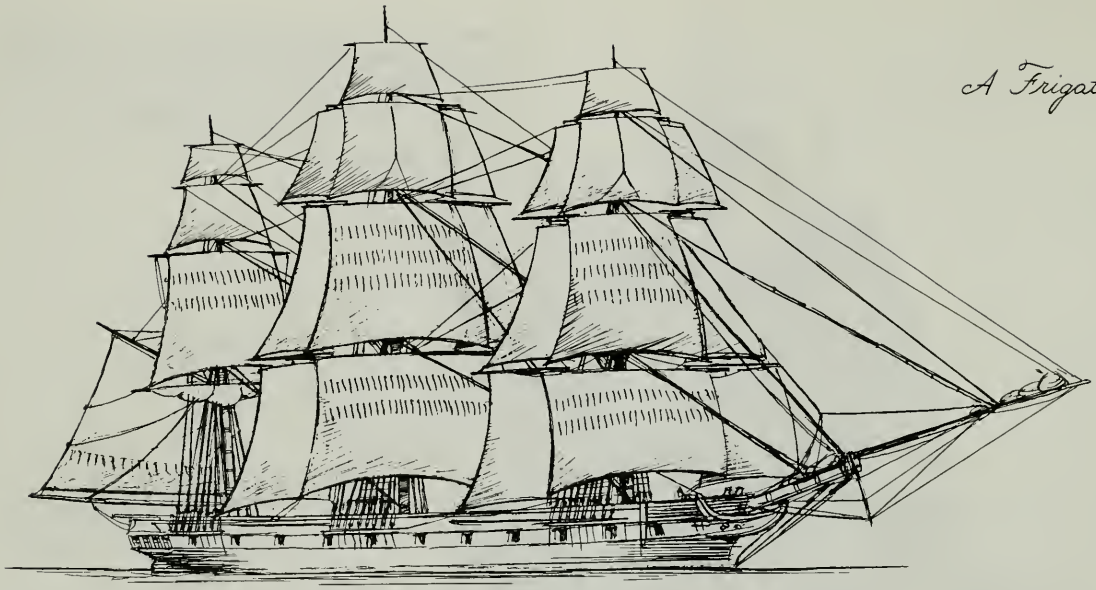
The lofty stern with windowed glass in quarter galleries, the bluff bow, and the heavily ornamented beak head forward —these are incidentals. The sturdy hull itself—as in wooden vessels of all ages—was built up from a massive timber, heavily reinforced, that extended the full length of the ship. This was called the keel or backbone. It curved into the stem forward and the sternpost aft. Between stem and sternpost were closely spaced rib timbers, molded to form, to which the outer planking and inner ceiling were spiked. The ensuing pages, with sketches of period ships, show how all nations followed the same trends in the art and mystery of



shipbuilding simply because they had the same elements—wind and water—to contend with. Ships were the first functional designs, and of all man's handiwork they have had the most far-reaching results. Transportation, as someone has said, is civilization! And the waterway in early days was the easiest highway.



A Dutch Frigate of the Seventeenth Century

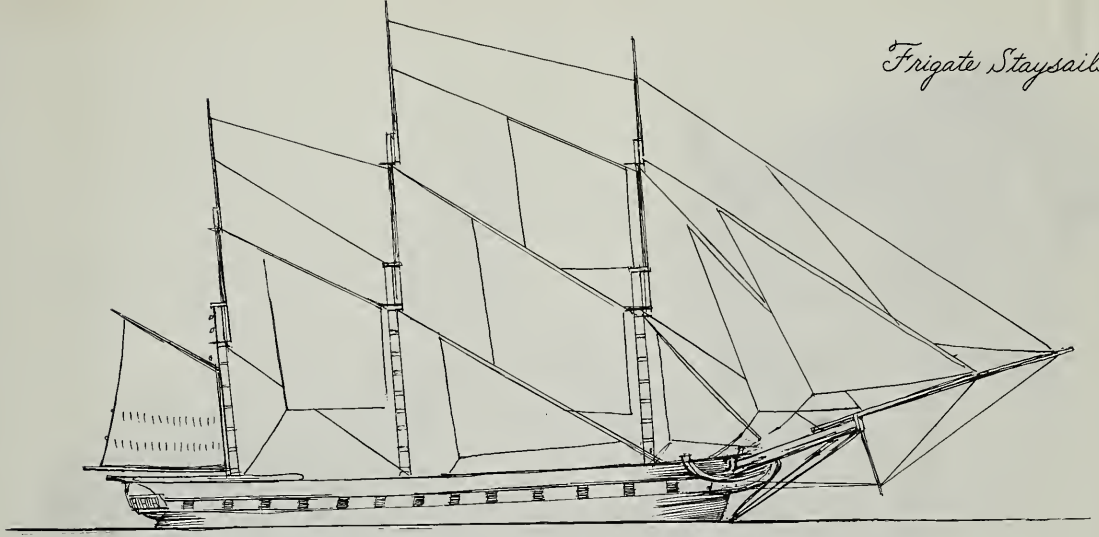


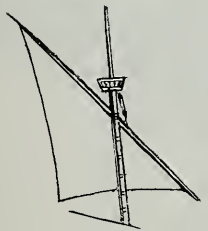
A Frigate

The frigate was the fast, heavy cruiser of her day, with a formidable battery, great sail spread, and clean lines. The page opposite shows her additional fore-and-aft staysails used in a beam or head wind. Note the squareness of the cut as compared with the triangular staysails of the cape horners on other pages.

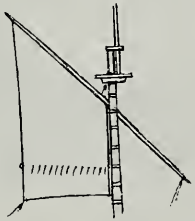
The four small diagrams show the development of the spanker.

Frigate Staysails

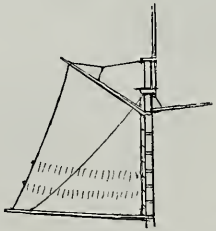




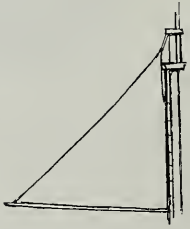
Seventeenth Century

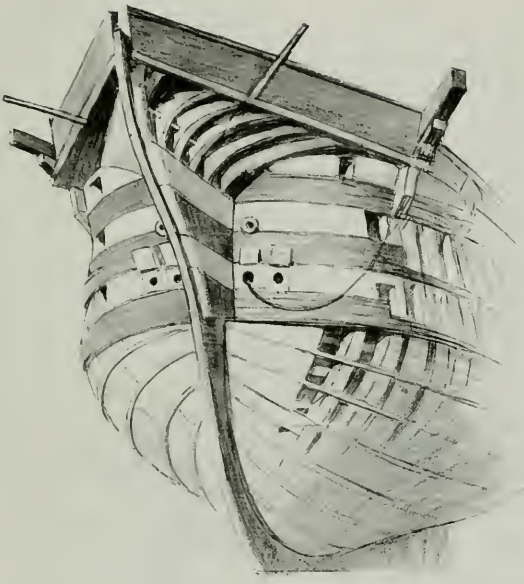


Eighteenth Century



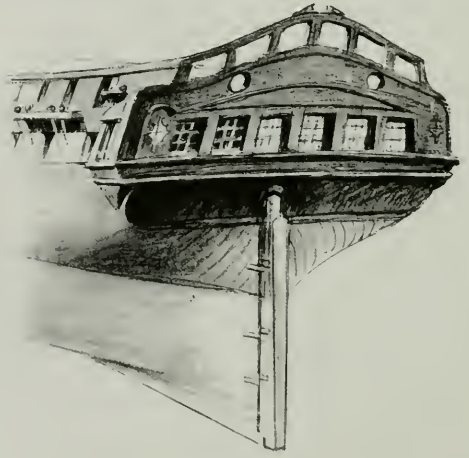
Nineteenth Century

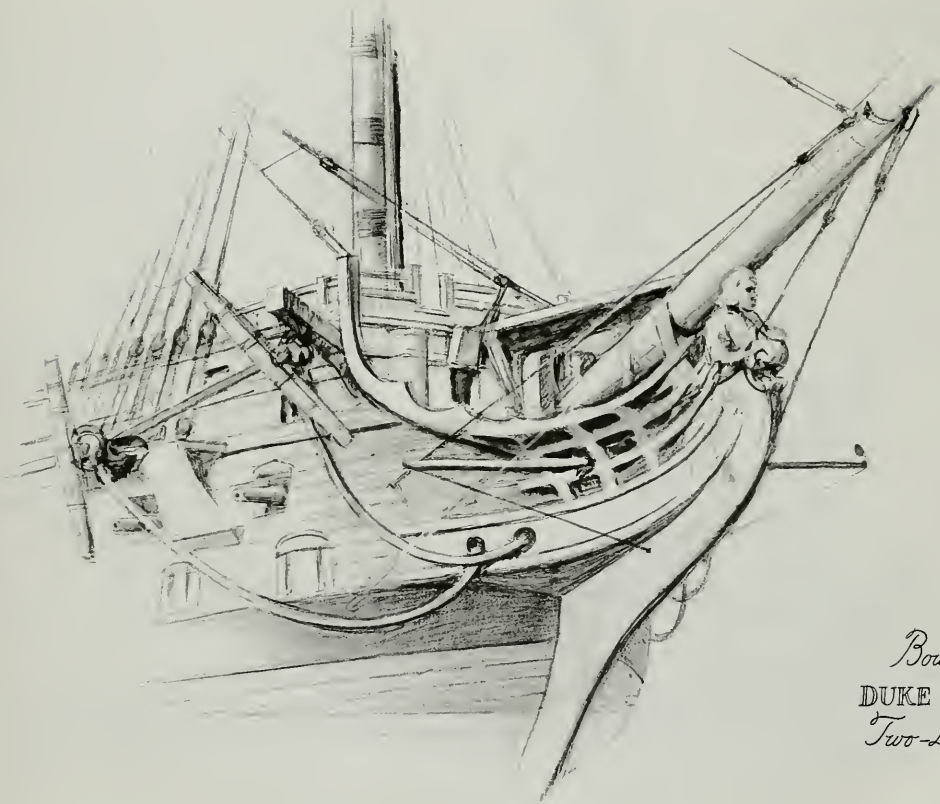




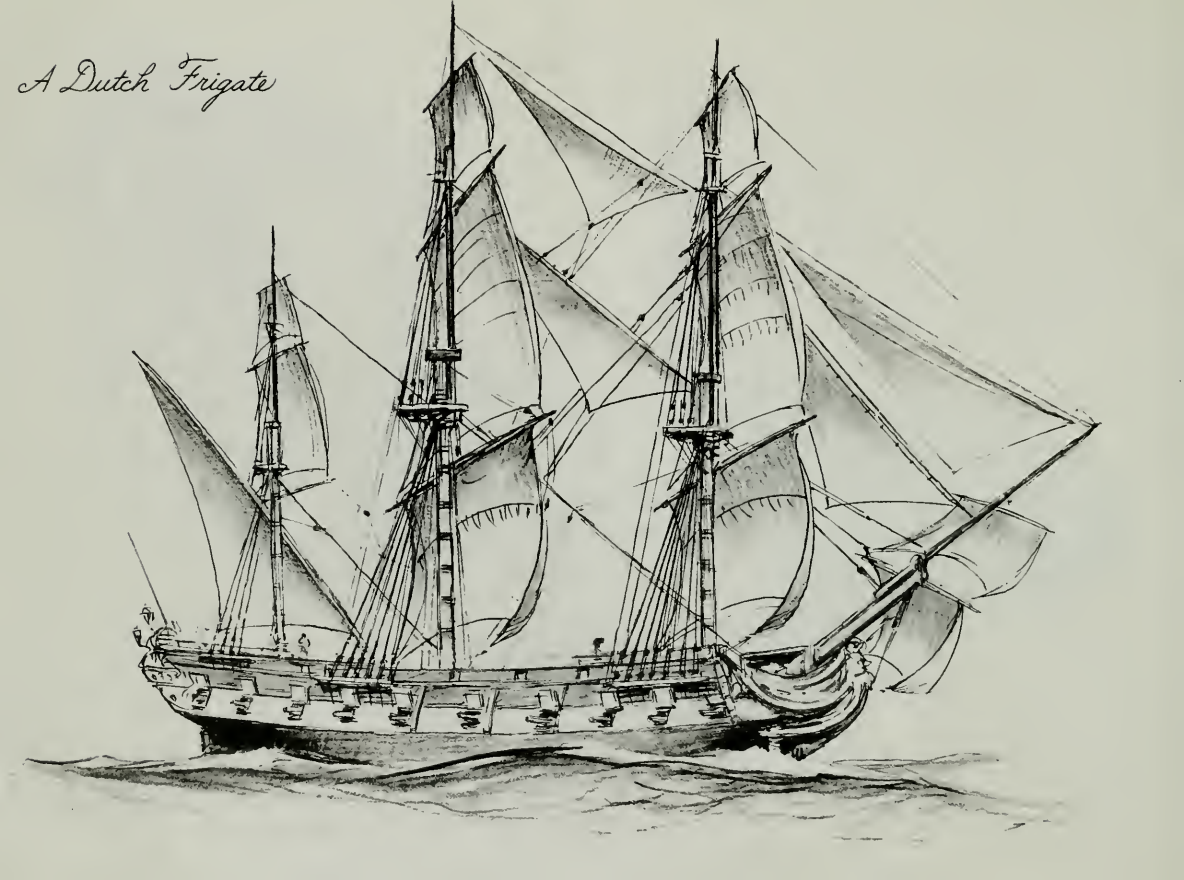
Bow of a French Three-Decker, About 1820

Stern of an English Frigate,
Early Nineteenth Century

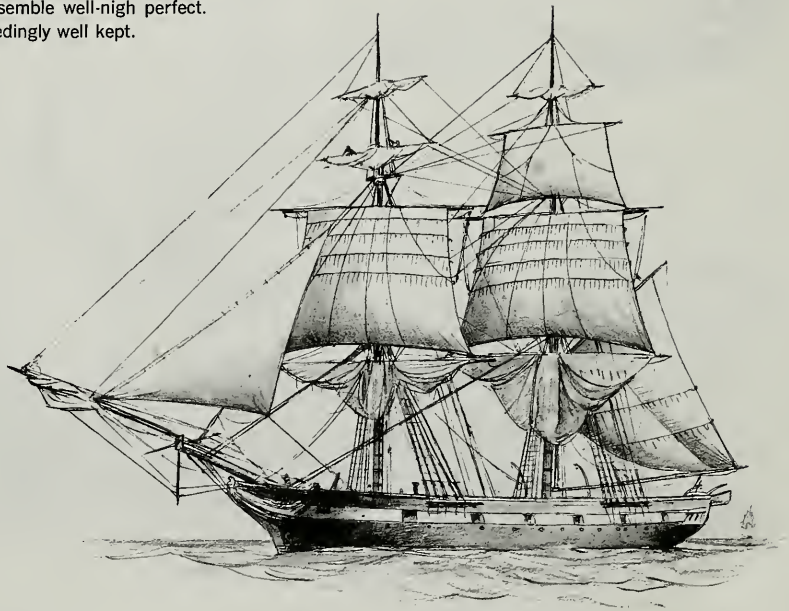




Bow of the
DUKE - *British*
Two-Decker


A Dutch Frigate

During the eighteenth century and well into the nineteenth, the brig was a popular coastwise rig. But the schooner, pointing closer into the wind than a square-rigger, and much more nimble in making short tacks while getting in and out of harbors, eventually superseded her. Frequently used in the West India trade, the hermaphrodite brig or half brig was the prettiest rig by far. Her variety, balance, symmetry, and grace built up an ensemble well-nigh perfect. These vessels were fast and exceedingly well kept.



A Brig

The Helmsman

A Hermaphrodite Brig

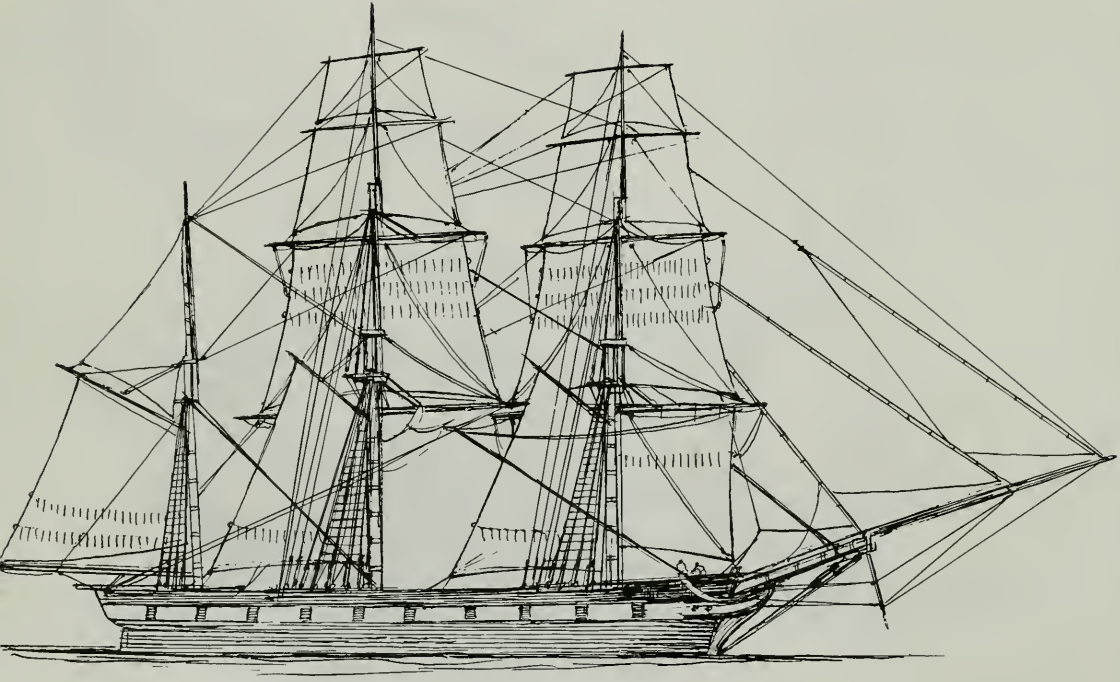
The Bark

The bark ranks next to the ship. In moderate-sized vessels this rig is much handier, since the fore-and-aft rig on the mizzenmast does away with the braces of the yards leading **forward** to the main mast, while the braces of all the yards on the main retain their good, clear lead aft to the mizzenmast and to the port and starboard bumpkins.

In the largest type of ship the bark rig is not practical, except with four masts.

Bark of the Eighties

Bark – Early Nineteenth Century



A Clipper Ship

Use of Contrast Between Dark and Light

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